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## VERIFIED TRANSLATION

I, the undersigned Patricia HARDING, BA(Hons),  
technical translator to RWS Group plc, of Europa House, Marsham Way, Gerrards Cross,  
Buckinghamshire, England, do hereby declare:

- (1) That I am well familiar with the Swedish and English languages;
- (2) That the attached is a true and accurate translation into the English language of the Swedish text of this Patent Application entitled "Data Input Arrangement" that was filed in the US Patent and Trademark Office on 30 May 2000.
- (3) That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated this 21st day of July 2000

  
\_\_\_\_\_  
P. HARDING

For and on behalf of RWS Group plc



PATENT  
3782-0127P

2672

IN THE U. S. PATENT AND TRADEMARK OFFICE

APPLICANTS: Christer FÅHRAEUS et al. CONF. NO. 1132  
APPLN. NO.: 09/812,882 GROUP: 2672  
FILED: March 21, 2001 EXAMINER: Unknown  
FOR: METHOD AND SYSTEM FOR DIGITIZING FREEHAND  
GRAPHICS WITH USER-SELECTED PROPERTIES

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LETTER SUBMITTING TRANSLATION  
OF NON-ENGLISH LANGUAGE PROVISIONAL APPLICATION  
PURSUANT TO 35 U.S.C. § 119(e) AND 37 C.F.R. 1.78(a)(5)

Assistant Commissioner for Patents  
Washington, D.C. 20231

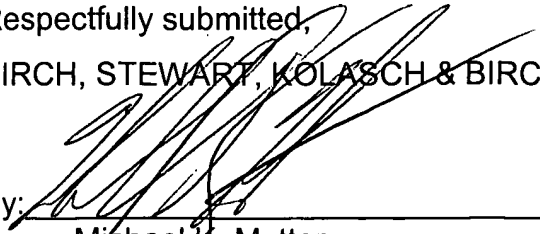
September 28, 2001

Sir:

In accordance with the requirements of 35 U.S.C. § 119(e) and 37 C.F.R. § 1.78(a)(5), attached hereto is a verified English language translation of U.S. Provisional Application No. 60/207,882 filed on May 30, 2000. This submission completes the claim for priority of this provisional application in the above-identified patent application.

If necessary, the Commissioner of hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

Respectfully submitted,  
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AP0008-

3782-127A

UNITED STATES PATENT APPLICATION

OF

CHRISTER FÅHRAEUS

AND

LINUS WIEBE

FOR

DATA INPUT ARRANGEMENT



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#### Field of the Invention

The present invention concerns an arrangement for inputting graphical information into a computer system in accordance with the preamble to claim 1, and a base suitable for incorporation in such an arrangement in accordance with claim 3. In addition it concerns a drawing device in accordance with claim 14 and a storage medium for digital information in accordance with claim 15.

#### Technical Background

Systems for inputting graphical information into computer systems are used to a great extent together with various types of graphics programs, CAD programs, web design programs, etc. In such a context the input system makes possible the input of hand-drawn figures into the program.

Input systems of this type often consist of a base and a drawing device. When the drawing device is moved over the base its movement is recorded in the system electronically as a graphical input, which can be transmitted to a computer system in digital form. An example of such an input system is described in US, 4,717,793, A. In this a base is arranged to detect inductively the position of a drawing device on the base. By repeated recording of this information, the movement of the drawing device across the base results in a graphical input.

Known input systems are often expensive. In addition they are usually unwieldy, particularly if the base is required to have a large input surface and if it is to be possible to input visual properties of graphic inputs. This makes the use of such input systems more difficult, particularly in mobile applications.

#### Summary of the Invention

This invention aims to solve the above-mentioned problems either completely or partly.

This aim is achieved by an arrangement for inputting graphical information into a computer system in accordance with claim 1, a base suitable for use in such an arrangement in accordance with claim 3, a drawing device in accordance with claim 14 and a storage medium for digital information in accordance with claim 15.

According to a first aspect of the invention an arrangement is provided for inputting graphical information into a computer system, the graphical information arising when a drawing device is moved relative to a base. The arrangement is characterized in that the base is provided with a position-coding pattern and in that the drawing device is arranged to detect positions on the base by means of the position-coding pattern. In addition the computer system is arranged to record position information from the drawing device indicating positions within a first domain on the base as graphical inputs. Position information from the drawing device indicating posi-

tions within a second domain on the base is recorded as information concerning a visual property associated with a graphical input.

Such a position-coding pattern can be designed in the way described in the Applicant's patent applications SE 9901954-9 and SE 9903541-2, which is hereby incorporated by reference. These were submitted on 28th May 1999 and 1st October 1999 respectively and were therefore not published at the time of the submission of this application. Such a drawing device has a number of applications in addition to the input of graphical information into graphics programs, etc. A user who has such a drawing device for other applications can therefore realize an arrangement in accordance with the invention just by the use of a suitable position-coded base, for example a sheet of paper, and suitable software, for example in a personal computer. Both the software and the base are relatively cheap to produce, for which reason an arrangement in accordance with the invention can be achieved at low cost. The arrangement also permits the carrying out of graphical inputs with various visual properties which can be selected.

In addition an arrangement in accordance with the invention is suitable for mobile applications, even if the base is made large. If the base is constructed as a sheet of paper it can simply be folded up.

In accordance with a preferred embodiment the computer system is integrated in the drawing device. This makes possible even greater mobility. A graphical image can thus be produced in the drawing device and, for example, later transmitted via a mobile telephone system to a server, without having a personal computer on site.

According to a second aspect of the invention a base is provided for the input of graphical information into a computer system, the graphical information arising when a drawing device is moved relative to the base. The base is provided with a position-coding pattern which makes it possible to detect positions on the base using the drawing device which is arranged to transmit position information to the computer system. The base has a first and a second domain. Positions within the first domain are intended to be detected by the computer system as graphical inputs and positions within the second domain as information concerning a visual property associated with a graphical input. A sub-domain within the second domain, where positions within the sub-domain are intended to be detected by the base as information concerning a visual property, is provided with a visible, visual indicator representing this information. This makes the use of an arrangement such as that described above, considerably easier.

The first and the second domain on the base are preferably separated from each other in a visible way, which

makes it easier for a user to work with an arrangement according to the invention.

The information concerning visual properties can preferably consist of color information, which enables more expressive graphical inputs to be carried out, as several colors can be used.

According to another embodiment the information concerning visual properties can consist of line type information, which enables more expressive graphical inputs to be carried out, as several types of line can be used, for example solid, dotted and broken.

According to a further embodiment the information concerning visual properties can consist of line width information, which enables more expressive graphical inputs to be carried out, as several line widths can be used.

When the second domain is used for color information, a sub-domain within the second domain, where a position within the sub-domain is intended to indicate a particular color, can preferably be colored with this color. This results in a user interface which is independent of language.

According to another embodiment a sub-domain within the abovementioned second domain, where a position within the sub-domain is intended to indicate a particular color, can be provided with an alphanumeric indicator signifying this color. This makes it possible for a user



with limited color vision to be able, in spite of this, to carry out graphical inputs with color properties as required.

According to yet another embodiment the second domain can comprise a set of visually separated sub-domains, each provided with at least one alphanumeric symbol. This makes possible the input of properties from a great number of visual properties even though only a small second domain is provided. This is because a combination of sub-domain indications can be made arbitrarily long.

According to a third aspect of the invention a drawing device is provided for inputting graphical information into a computer system, where the graphical information arises when the drawing device is moved relative to a base. The drawing device is arranged to detect positions on the base by the utilization of a position-coding pattern marked on the base. A computer system integrated in the drawing device is arranged to detect positions within a first domain on the base as graphical inputs and positions within a second domain on the base as information concerning visual properties associated with a graphical input. The advantages of such a drawing device are shown in the discussion above. The drawing device can also be varied in a number of ways corresponding to the base described above.

According to a fourth aspect of the invention a storage medium for digital information is provided, which can be read by a computer system, the storage medium containing a program for inputting graphical information into a computer system where the program defines the following steps: recording of position information from a drawing device indicating positions within a first domain on a base as graphical inputs; and recording of position information from a drawing device indicating positions within a second domain on the base as information concerning visual properties associated with a graphical input. Such a program makes possible the function of an arrangement of the type described above. The program can also be varied in a number of ways corresponding to the base described above.

#### Brief Description of the Drawings

Fig. 1 shows an arrangement for inputting graphical information in accordance with the invention.

Fig. 2 shows an alternative embodiment of a base intended to be used in such an arrangement.

Fig. 3 shows a further embodiment of such a base.

Fig. 4 shows diagrammatically the steps in a computer program suitable for use in an arrangement in accordance with the invention.

#### Description of Preferred Embodiments

Fig. 1 shows an arrangement for inputting graphical information in accordance with the invention. The

arrangement comprises a drawing device 1 which is moved over a base 3. In the embodiment shown a trail 5, preferably of ink, is deposited on the base 3. This is not, however, necessary. The base can be made of an easily erasable material, which means that the base 3 can be used many times. A position-coding pattern 7 (shown enlarged) is printed on the base.

The position-coding pattern 7 is so designed that if part of the pattern with a certain minimum size is recorded, then this part of the pattern's position in the pattern and thereby on the base can be determined unambiguously.

The positioning coding pattern 7 can advantageously be of such a type as shown in the Applicant's above-mentioned Applications SE 9901954-9 and SE 9903541-2 where each position is coded by a number of symbols and where a symbol is used to code a number of positions. The position-coding pattern 7 shown is constructed as shown in SE 9901954-9, where a large dot represents a "one" and a small dot represents a "zero". It is, however, also possible to design the position-coding pattern 7 as described in SE 9903541-2, where different displacements of a dot in relation to a raster point code different symbol values.

The drawing device 1 is arranged to detect positions on the base 3 utilizing the position-coding pattern 7. When the drawing device 1 is moved relative to the base 3

and in contact with this, the drawing device records a series of positions on the base 3, which series is transmitted to a computer system 9, in this case a personal computer. The transmission of the position information can be carried out by means of various types of cables or by means of an infrared link. However, a short-range radio link is preferably used, for example in accordance with the BLUETOOTH standard. The position information can be transmitted as a set of pairs of co-ordinates, but preferably the drawing device 1 first converts the series of pairs of co-ordinates into a polygon train which is then transmitted. It is recognized that the transmission can be carried out in several steps. For example, an input can be carried out with the drawing device and base and then the position information is transmitted to a personal computer. This information can then be transmitted over a network to a server, in which interpretation of the graphical inputs is carried out.

The base 3 comprises a first domain 11 corresponding to a first number of pairs of co-ordinates, and a second domain 13, corresponding to a second number of pairs of co-ordinates. The first domain 11 and the second domain 13 on the base 3 are visually separated, in this case by means of a printed line 15.

The computer system 9 is arranged, using suitable software, to record position information from the drawing device, for example in the form of a polygon train, with-

in the first domain 11 as a graphical input. In the example shown, a trail 5 is deposited as mentioned when the drawing device 1 is moved over the base 3 in contact with this. As this movement takes place within the first domain 11, the computer system 9 records the position information which then arises and which is transmitted as a graphical input 17. The graphical input 17 is thus graphical digital information which corresponds to a copy of the trail 5. This graphical input 17 can, for example, be reproduced on the screen 19 of the computer system 9. When a position within the first domain is recorded, a corresponding pixel in an image in an application is set accordingly to "one". A graphical input thus means that at least one image pixel, stored or displayed, changes state. A number of graphical inputs can make up an image which, for example, can be sent with an e-mail.

The computer system 9 is also arranged to record position information from the drawing device 1 within the second domain 13 as information concerning a visual property associated with a graphical input. For example, as already shown, after having created and recorded a graphical input 17, the user can point with the drawing device 1 at a particular sub-domain 21 in the second domain 13 and thereby assign to the graphical input 17 a property (for example the color blue) associated with this sub-domain 21. This can also be done before the graphical input 17 is carried out, depending upon how the

software in the computer system 9 is set. A sub-domain 21 within the second domain 13, where a position within the sub-domain 21 is intended to indicate a particular visual property, is suitably provided with a visible, visual indicator 22 representing this property.

The computer system can also be integrated into the drawing device. In this way a complete graphic image can be produced in the drawing device and then, for example, transmitted by means of a mobile telephone system to a server or the like. The drawing device 1 can also be integrated into, for example, a mobile telephone. It is also possible to let a computer system in the drawing device identify which positions are to be interpreted as graphical inputs and which are to be interpreted as visual properties. The information corresponding to graphical inputs with particular properties can then be transmitted to another computer system, for example a personal computer.

Fig. 2 shows an alternative embodiment of a base 3' intended to be part of an arrangement according to the invention. Also here the base 3' comprises a first domain 11' and a second domain 13'. In this embodiment these are produced as physically separate units. As in the previously shown embodiment, the first domain 11' is used to create graphical inputs and to accept a corresponding trail 5'. The second domain 13' is used to assign visual properties to the graphical inputs.

Fig. 3 shows a further embodiment of a base 3" according to the invention. Also here the base 3" comprises a first domain 11" and a second domain 13". As in the previously shown embodiment the first domain 11" is used to create graphical inputs and to accept a corresponding trail 5". The second domain 13" is used to assign visual properties to the graphical inputs. The second domain 13" has here a number of divisions 23, 25, 27, 29, 31, 33, each containing a number of sub-domains 21". Each sub-domain 21" comprises a set of positions. When a computer system in the arrangement detects any of the positions within this set, this is recorded as information concerning a visual property corresponding to this sub-domain 21". The position codes in the sub-domain 21" do not normally occur within other sub-domains in the base 3".

The information concerning a visual property can be color information. The base 3" has here a first division 23 and a third division 27 in the second domain 13" which are used for recording color information. The sub-domains within the first division 23 are printed with alphanumeric indicators 22" signifying the colors represented by the sub-domains. In this case these consist of the names of the colors, but, for example, color codes could also be used. The sub-domains in the third division 27 have been colored with the colors (shown here by different shading) they represent, which provides a user interface

which is independent of language. The second division 23 is used in a similar way to represent line thickness information and the fourth division 29 is used to represent line type information.

A fifth division 31 in the second sub-domain 13" comprises visually separated sub-domains, each provided with at least one alphanumeric character. By pointing at a sequence of these characters the user can input an arbitrarily long code, corresponding to a particular visual property. In this way a small surface can be provided with means for reliable indication of a large number of properties.

A sixth division 33 is used for specifying in which layer a graphical input is to be deposited, in for example a drawing.

Fig. 4 shows diagrammatically the steps in a computer program suitable for incorporation in an arrangement according to the invention where a base has two domains. The program, which can be stored on any digital storage medium (for example a diskette), defines steps as follows. After the identification 41 of a position, which is preferably carried out in the drawing device, it is determined 43 whether the position lies within the first domain. If such is the case, there is a first recording 45 of the position information as a graphical input. This first recording comprises a number of subroutines (not shown). Otherwise the position lies within the second



domain, so that a second recording 47 of the position information takes place as information concerning visual properties of a graphical input. The second recording also comprises a number of sub-routines (not shown).

The scope of the patent protection applied for is not restricted to the embodiments described above. The invention can be varied and changed in a number of ways within the scope of the following claims.

What we claim and desire to secure by Letters Patent is:

1. An arrangement comprising a base (3), a drawing device (1) and software in a computer system (9), for inputting graphical information into the computer system (9), the graphical information arising when the drawing device (1) is moved relative to the base (3), characterized in that the base (3) is provided with a position-coding pattern (7) and in that the drawing device (1) is arranged to detect positions on the base (3) by means of said position-coding pattern (7) for the transmission of position information to the computer system (9), the computer system (9) being arranged using said software to record position information from said drawing device (1) indicating positions within a first domain (11) on said base (3) as graphical inputs, and to record position information from said drawing device (1) indicating positions within a second domain (13) on said base (3) as information concerning visual properties associated with a graphical input.

2. The arrangement for inputting graphical information according to claim 1, characterized in that said computer system is integrated in said drawing device.

3. A base for inputting graphical information into a computer system, the graphical information arising when a drawing device is moved relative to the base, characterized

(continued)

(continued claim 3)

a c t e r i z e d in that the base (3) is provided with a position-coding pattern (7) which makes it possible to detect positions on the base (3) using the drawing device, which is arranged to transmit position information to the computer system; in that the base (3) has a first domain (11) and a second domain (13), positions within the first domain (11) being intended to be detected by the computer system as graphical inputs and positions within the second domain (13) being intended to be detected by the computer system as information concerning visual properties associated with a graphical input; and in that a sub-domain (21) within said second domain (13), where positions within the sub-domain (21) are intended to be detected by the computer system as information concerning a visual property, is provided with a visual indicator (22) representing this information.

4. The base according to claim 3, c h a r a c - t e r i z e d in that said second domain is separated in a visible way from said first domain.

5. The base according to claim 4, c h a r a c - t e r i z e d in that said second domain is physically separated from said first domain (Fig. 2).

6. The base according to claim 3, c h a r a c - t e r i z e d in that said information concerning visual properties consists of color information.

7. The base according to claim 3, c h a r a c -  
t e r i z e d in that said information concerning visual  
properties consists of line type information.

8. The base according to claim 3, c h a r a c -  
t e r i z e d in that said information concerning visual  
properties consists of line thickness information.

9. The base according to claim 6, c h a r a c -  
t e r i z e d in that a sub-domain within said second  
domain, where a position within the sub-domain is  
intended to indicate a particular color, is colored with  
that color.

10. The base according to claim 6, c h a r a c -  
t e r i z e d in that a sub-domain (21", Fig. 3) within  
said second domain (13", Fig. 3), where a position with-  
in the sub-domain (21", Fig. 3) is intended to indicate a  
particular color, is provided with an alphanumeric indi-  
cator (22", Fig. 3) signifying this color.

11. The base according to claim 10, c h a r a c -  
t e r i z e d in that said alphanumeric indicator con-  
sists of the name of the color.

12. The base according to claim 10, c h a r a c -  
t e r i z e d in that said alphanumeric indicator con-  
sists of the color's color code.

13. The base according to claim 4, c h a r a c -  
t e r i z e d in that said second domain comprises a set  
of visually separated sub-domains, each provided with at  
least one alphanumeric symbol.

14. A drawing device for inputting graphical information into a computer system, the graphical information arising when the drawing device is moved relative to a base, characterized in that the drawing device is arranged to detect positions on said base by means of a position-coding pattern marked on the base; and in that a computer system integrated in the drawing device is arranged to detect positions within a first domain on the base as graphical inputs and positions within a second domain on the base as information concerning visual properties associated with a graphical input.

15. A storage medium for digital information, which can be read by a computer system, the storage medium containing a program for inputting graphical information into a computer system, characterized in that said program defines the following steps:

- recording of position information from a drawing device indicating positions within a first domain on a base as graphical inputs, and

- recording of position information from a drawing device indicating positions within a second domain on said base as information concerning visual properties associated with said graphical inputs.

## Abstract of the Disclosure

This invention relates to an arrangement for inputting graphical information into a computer system, where the graphical information arises when a drawing device is moved relative to a base. The base is provided with a position-coding pattern and the drawing device is arranged to detect positions on the base by means of the position-coding pattern. The computer system is arranged to record position information from the drawing device indicating positions within a first domain on the base as graphical inputs and position information indicating positions within a second domain on the base as information concerning a visual property associated with the graphical input.

Elected for publication: Fig. 1

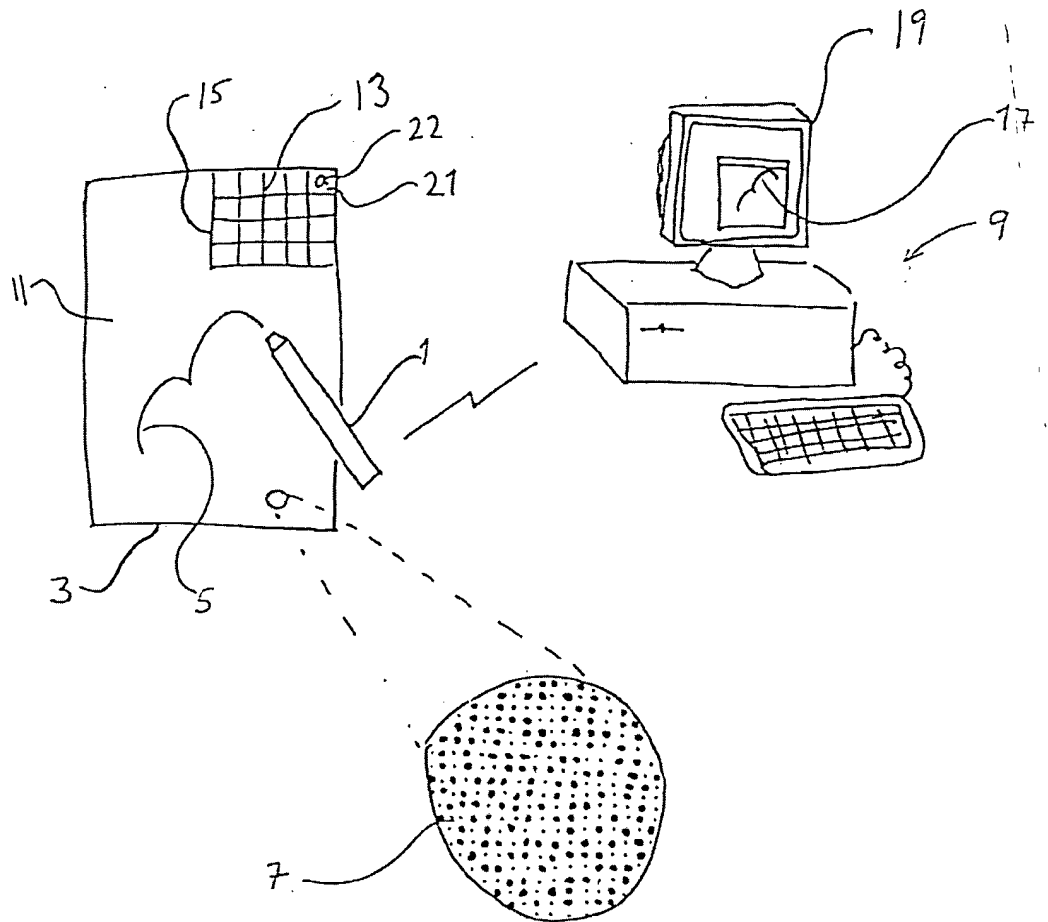


Fig. 1

Fig. 2

2/3

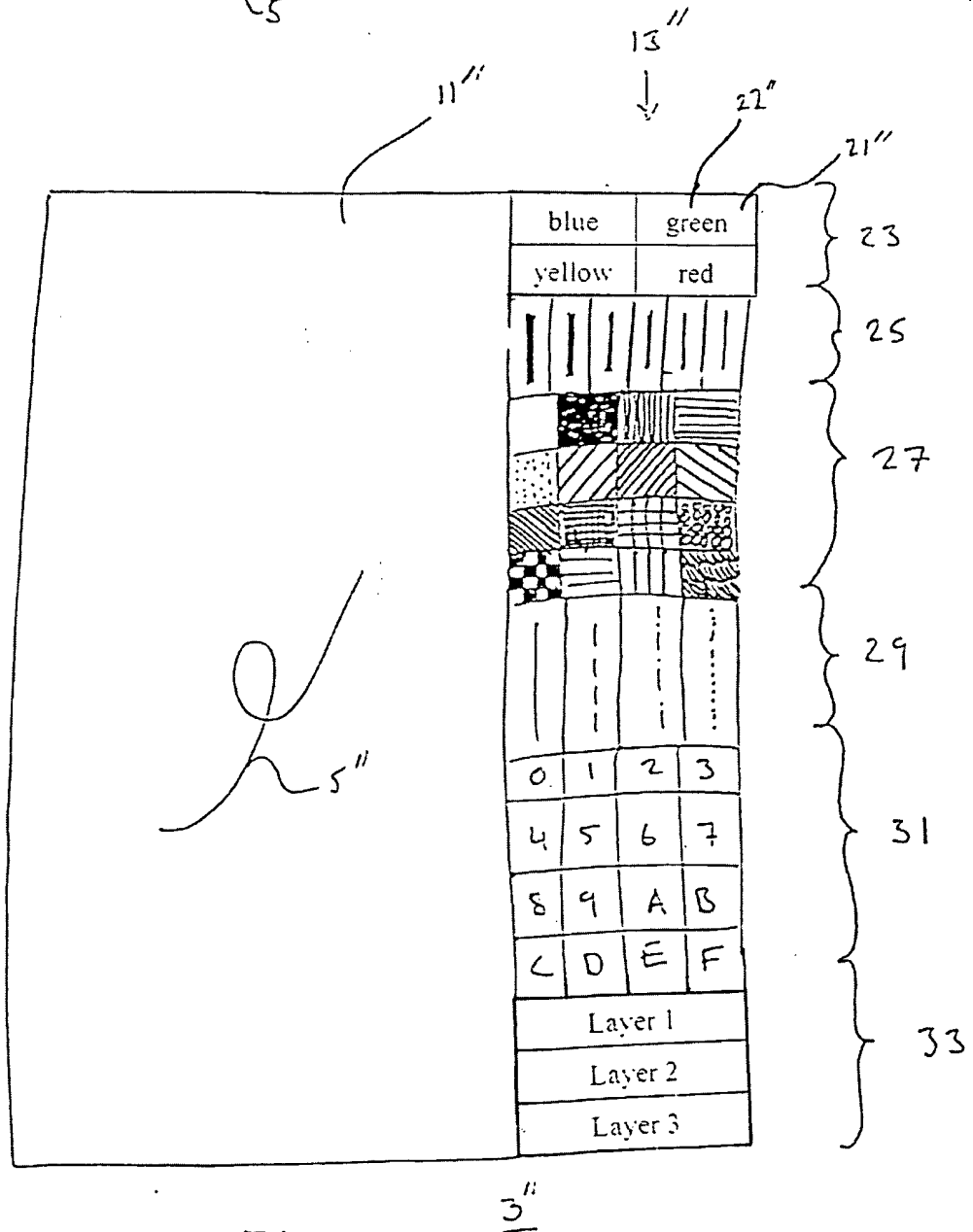
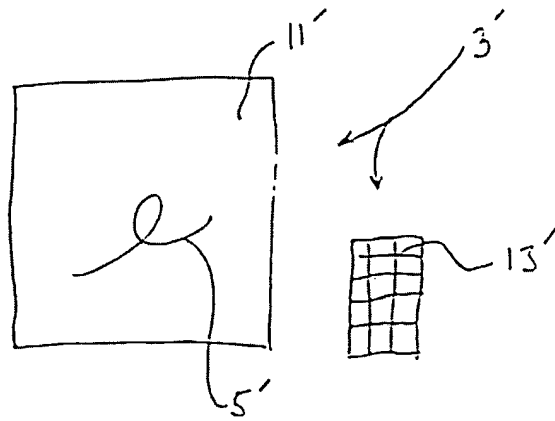


Fig. 3

3''



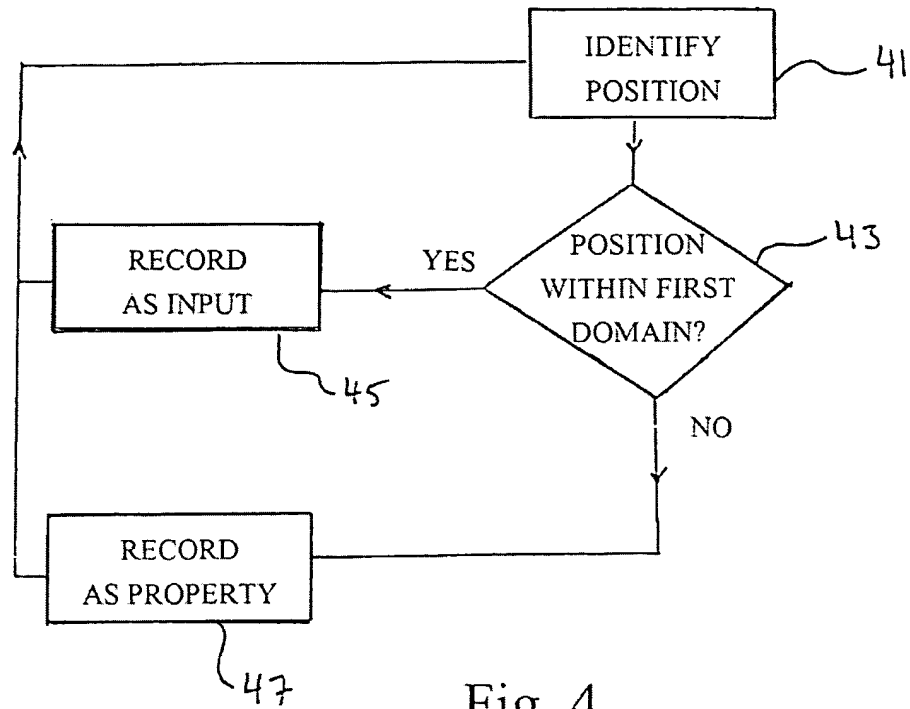


Fig. 4

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